

locating the work in a separate drill jig. In other cases it may be better to do the drilling first and locate the work for the boring operations from the drilled holes. The designer should decide which method would be preferable, considering the time required and the accuracy of the work. It is impossible to give any definite rules for this work; but it may be said that combination jigs should be used only when the drilled and bored holes have nearly the same diameters. As a general rule, when the holes are of widely different diameters, two jigs are preferable. For example, if a few holes of small diameter for holding a collar or bracket were located around a large bored hole, and were drilled with the same jig used for the large hole, the jig, when used on a small drill press, would be entirely too heavy to manipulate. It is likely that in such a case a small separate drill jig could be attached directly to the work. In many other cases, however, it will prove a distinct saving to combine the boring and drilling jig in one.

In Figs. 14 and 15 is shown a combination drill and boring jig of large size. The work consists of a headstock for a lathe with a number of holes to be drilled. The large holes $\frac{1}{2}$, Fig. 15, at both ends of the headstock are cored as usual, and allow the boring bar to enter for taking the roughing cut. The holes at C and D are opened up by drills previous to the boring operation. As there is considerable distance between the end of the headstock and the uprights of the jig, long bushings are used to give the tools a good bearing close to the work. Both the drilling and boring operations may be performed on a horizontal boring and drilling machine. As the horizontal boring and drilling machines usually have adjustments in all directions, the only moving of the jig necessary is to turn it around for drilling the holes on the opposite sides.